

**REMARKS**

Claims 2-4 and 9-11 have been rejected under 35 USC 103(a) as being unpatentable over Applicant's admitted prior art (AAPA) or JP 2000036370A further in view of JP355165288A and further in view of JP404224628A. Applicant respectfully traverses this ground of rejection and urges reconsideration in light of the following comments.

The presently claimed invention is directed to an electron bombardment heating apparatus for heating a material which comprises a filament for emitting thermions therefrom, means for accelerating the thermions emitted from the filament toward a heating plate, a heating plate which is heated by bombardment of the accelerated thermions and serves as a means for supporting the material to be heated, and a supporting member having the heating plate provided at a top portion thereof, vertically disposed cylindrical peripheral wall portions which have a different diameter from each other and a horizontally disposed annular wall portion which extends in a radial direction and connects the vertically disposed cylindrical peripheral wall portions with each other.

As discussed in our previous response, electron bombardment heating is known in which accelerated electrons strike or impinge the rear surface of a heating plate to generate heat therein so that the heating plate serves as a means for heating up a plate-like material, such as a semiconductor wafer, placed thereon. In the apparatuses for performing this type of heating, a heated material supporting member is typically formed from heat-resistant silicon carbide impregnated with silicon or a ceramic and is subject to thermal stress. During the beginning of the heating of the heating plate, the heating plate undergoes thermal expansion which causes the heated material supporting member to deform and concentrate thermal stress on a shoulder portion. Repeated heating and cooling of the heating plate causes the heated material supporting member to repeatedly undergo

thermal stress, eventually fatigues and deteriorates and finally breaks.

In order to overcome the problems discussed above in conventional electron bombardment heating apparatuses, the present inventors conducted extensive studies and discovered that when a supporting member is used which comprises vertically disposed cylindrical peripheral wall portions having different radiuses, the thermal stress that is generated during the heating of the heating plate can be relieved or mitigated so that the heating material supporting member hardly fatigues and breaks, even during repeated heating and cooling steps. It is respectfully submitted that the prior art cited by the Examiner does not disclose the presently claimed invention.

The so-called "Applicant's Admitted Prior Art" and JP 2000-036370 A both disclose an electron bombardment heating apparatus in which a flat heating plate is heated by accelerated thermions from a filament to heat a thin-flat object as required by the present claims. However, in both of these references, the supporting member is formed of a top portion and a vertically disposed cylindrical wall portion having the same diameter. That is, "Applicant's Admitted Prior Art" and JP 2000-036370A does not disclose the supporting member comprising vertically disposed cylindrical wall portions which have different diameters from each other and a horizontally disposed annular wall portion which extends in a radial direction and connects the vertically disposed cylindrical peripheral wall portions with each other. As such, the secondary references cited by the Examiner must provide the motivation to one of ordinary skill in the art to modify the primary prior art cited by the Examiner in a manner that would yield the presently claimed invention. It is respectfully submitted that the secondary references contain no such disclosure.

JP 35-5165288A discloses an ion beam finishing apparatus in which an inert gas supplied from a gas lead-in pipe 12 is

discharged and ionized between an anode chamber 11 and cathode electrode 13. The plasma generation density is modified by a solenoid 14 and ions are drawn out in a beam by an accelerator part 12 to impinge on a metal mold 8. Although this reference does disclose a chamber having plural diameter portions, the current claims require a heating plate which is heated by bombardment of accelerated thermions which also serves as a means for supporting a material to be heated and a supporting member having the heating plate provided at the top portion thereof which comprises vertically disposed cylindrical peripheral wall portions which have a different diameter from each other and a horizontally disposed annular wall portion which extends in a radial direction and connects the vertically disposed cylindrical peripheral wall portions with each other. Since the chamber of JP 35-5165288A which has plural diameter portions does not serve as a supporting member according to the present invention, this reference would not provided any motivation to one of ordinary skill in the art to modify the primary prior art cited by the Examiner in a manner that would yield the presently claimed invention.

JP 40-4224628A discloses an electron beam irradiation apparatus which has been cited by the Examiner as disclosing a shielding body 4. However, this reference, along with JP 35-5165288A, contains no disclosure which would motivate one of ordinary skill in the art to modify the supporting wall members of "Applicant's Admitted Prior Art" and JP 2000-036370A in a manner that would provide the presently claimed invention. As such, it is respectfully submitted that the references cited by the Examiner do not even present a showing of prima facie obviousness over the presently claimed invention under 35 USC 103(a).

Reconsideration of the present application and the passing of it to issue is respectfully solicited.

Respectfully submitted,

  
\_\_\_\_\_  
Terryence F. Chapman

TFC/smd

FLYNN, THIEL, BOUTELL  
& TANIS, P.C.  
2026 Rambling Road  
Kalamazoo, MI 49008-1631  
Phone: (269) 381-1156  
Fax: (269) 381-5465

Dale H. Thiel	Reg. No. 24 323
David G. Boutell	Reg. No. 25 072
Terryence F. Chapman	Reg. No. 32 549
Mark L. Maki	Reg. No. 36 589
Liane L. Churney	Reg. No. 40 694
Brian R. Tumm	Reg. No. 36 328
Steven R. Thiel	Reg. No. 53 685
Donald J. Wallace	Reg. No. 43 977
Sidney B. Williams, Jr.	Reg. No. 24 949

Encl: Postal Card

110.0703